An-Najah Univ. J. Res. (N. Sc), Vol. 17(1), 2003

The Impact of Implementing Quality Management Principles of IS09000 on Business Effectiveness: An Applied Study at Palestinian Businesses

تحليل نتائج تطبيق مبادئ نظام إدارة الجودة الأيزو ٩٠٠٠ في مؤسسات الأعمال: دراسة في واقع المؤسسات الفلسطينية

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Received: (29/4/2002), Accepted: (25/5/2003)

Abstract

The management of quality has received considerable attention in recent years and various studies have documented analysis and results of the impact of quality management models on organizational effectiveness. This research study provides details of an investigation of the impact of the principles of ISO9000 quality management system on improving organizational effectiveness in Palestine. Using a recent survey of ISO9000 implementing companies, data were collected and analysed about critical quality management principles: quality strategy, continuous improvement, leadership development, and customer satisfaction, and the impacts were assessed using key organizational effectiveness indicators: employee satisfaction, quality, and productivity. Basic hypotheses were formulated and tested and the results showed that companies have indeed made significant efforts towards establishing genuine quality systems and consequently attained benefits in terms of effectiveness indicators. Furthermore, correlation analysis confirmed suggestions in the literature that a company’s performance is positively impacted by the establishment and implementation of quality principles and quality models.

ملخص

لقد ظهر الاهتمام في السنوات الأخيرة في موضوع إدارة الجودة وتناوله الباحثون بالتحليل حيث ظهرت الكثير من الدراسات التي توثق نتائج تطبيق إدارة الجودة على فعالية وأداء المؤسسات. تطرح هذه المقالة تحاليل ونتائج آثار تطبيق مبادئ نظام الآيزو ٩٠٠٠ على فعالية آداء المؤسسات الفلسطينية التي منحت شهادة هذا النظام. فباستخدام المسح الميداني لأربعين شركة تم جمع بيانات عن مبادئ نظام الآيزو ٩٠٠٠ المطبقة، وبالتحديد استراتيجية الجودة، التحسن المستمر، تطوير القيادات، ورضى العملاء، وتقييم آثار تطبيق هذه المبادئ من خلال مجموعة مؤشرات مهمة مثل رضى الموظفين، مستوى الجودة، ودرجة الإنتاجية. ولهذه الغاية يتم صياغة فرضيات إحصائية أساسية واختبارها وتشير النتائج إلى أن الشركات قد بذلت جهوداً فعلية من أجل تطبيق مبادئ الجودة وحققت لذلك بعض التحسن في معايير الأداء، وهذا يعزز النتائج المنشودة في الأدبيات حول وجود ارتباط إيجابي بين أداء الشركات وبين تطبيقها لمبادئ الجودة.

Introduction

The mission of any organization, whether private or public, for-profit or not-for-profit, is represented in providing quality products and services to its target customers in a manner that fulfills its strategic objectives. Today, due to world's trends towards open markets and free trade and deregulation of industries, international competition has become fiercely and continuously increasing with the advent of value seeking, informed and demanding customers. Therefore, understanding quality as a strategic business dimension and continuously improving it have become imperative critical factors in determining the overall business survival and prosperity; quality is a priority issue for this decade [1].

However, it is clear that a unified precise definition of quality still does not exist; it is a universal multi-faceted concept that can be interpreted as meeting customer requirements (e.g., Deming)[2], the degree of product/service conformance to specifications (e.g., Crosby)[3], or fitness for use (e.g., Juran)[4]. Quality can be interpreted in terms of product/service performance, durability, ease of use and maintenance, or totality of external features and specifications[5].

Regardless of variations in quality definitions and implications, international efforts were made to establish common models for quality management that would assure minimum performance requirements by organizations to give customers sufficient confidence that a product or service is actually complying with requirements mandated by competition and market dynamics [6]. International quality model ISO9000 series, established by the International Organization for Standardization (I.S.O.) has gained a widespread reputation for improving quality levels and business performance [7]. Besides, National quality models have been established in the form of Quality Prizes such as the Malcolm Baldridge National Quality Award in the United States of America, the Deming Prize in Japan, the European Quality Award in the European Union, King Abdullah II Quality Award in Jordan, and others (websites).

One important outcome of these quality management initiatives, whether international or national, is that they have assisted in establishing more specific practices of quality. In addition, the implementation of these quality models worldwide in various industrial and services sectors has launched a process of continuing efforts for research and studies that further strengthen the understanding of quality and the dynamics of implementing quality initiatives.

This article is devoted to investigating the impact of implementing the principles of the quality management system ISO9000 on the effectiveness of Palestinian organizations. A fundamental question is whether quality systems in Palestine have achieved stated objectives in influencing and enhancing organizational effectiveness.

Importance of the Study

While quality management systems in industrialized nations have been major focus of attention, implementation, and research for along time, the interest in the implementation of quality management systems in Palestine, like in most developing countries, has started only recently. Almost all quality related development efforts in Palestine have started after the arrival of the Palestinian National Authority. Much of these efforts was stirred up and encouraged by donors' projects that opened up opportunities for local businesses to learn from foreign experiences and use international benchmarks to improve the quality of their products and services with the hope of penetrating new local, regional or international markets [9].

Despite the increasing stresses and economic hardships due to occupation, Palestinians are seeking continuous modernization and adaptation to ever-changing challenges and conditions with the purpose of improving organizational effectiveness. Political conditions combined with other typical difficulties such as scarce natural resources, limited internal and external markets, small-size organizations, problems of attracting new investment capitals, and very weak infrastructures, all require that efforts be seriously undertaken to investigate, scrutinize, and improve Palestinian quality as a viable means for securing markets and organizational stability and growth. These considerations establish a justifiable basis for this study that has been the first in Palestine in terms of objectives, methodology, and analysis.

Objectives of the Study

The objectives of this study can be summarized as follows:

- Assess the degree of implementing basic principles of IS09000 quality management system in terms of key dimensions including presence of a clear organizational strategy, customer satisfaction, leadership development and continuous process improvement.
- Assess the impact of implementing the principles of the IS09000 system on key organizational performance indicators. Such indicators include employee

satisfaction, quality, and productivity that together represent business effectiveness.

- Identify major problem areas in implementing the IS09000 system and develop solution recommendations based on analysis and results.

Previous Studies

Despite the very short history of the IS09000 system implementation especially in the Middle East region, there had been many studies that dealt with various aspects of the system and implications of its implementation. This section presents an overview of some of the relevant research studies and surveys conducted in Palestine, in the region, and internationally.

In Palestine, only two studies were conducted that addressed IS09000 and TQM implementations; particularly those of Hraish [10] and Abdellatif [11]. The first study was a descriptive survey of organizations that implemented the IS09000 system, providing a demographic description of companies and summarizing manager's opinions on problems facing the implementation and achieved benefits. The latter study represented a first analytical research that assessed the extent of implementing TQM principles and tools in non-governmental service organizations in West Bank including organizations of various sectors such as utilities, banks, hospitals, insurance companies, and telecommunications. The study concluded that gaps were present to a very substantial extent in the implementation of TQM principles, and to overcome implementation difficulties, the study presented a management model for implementing TQM principles and tools that would lead to the establishment of a new work culture where human resources should be the focus for development.

Several studies were conducted in various Arab Countries that dealt with the impact of IS09000 and TQM implementation at various manufacturing and service sectors. Some of these studies addressed IS09000 implementation aspects at specific large firms, while others dealt with sectoral impact of IS09000 quality initiatives. For example, Ajlouni [12] conducted a study to determine behaviour of financial performance in public shareholding Jordanian companies that were implementing IS09000 initiatives in which he found a positive relationship between these two dimensions. Tarawneh [6] implemented a study that dealt with assessing the advantages of IS09000 at manufacturing firms in Jordan and found a positive strong relationship between organizational aspects and the various clauses of the standard. Obaidat and Kurdi [16] showed

that quality levels at printing industrial firms in Jordan were still moderate, thus warranting the immediate attention to quality matters as a major business dimension. Haj Ali [13], Shajrawi [14], and Sadder [15] conducted research studies at various Jordanian companies that implemented a form of ISO9000 in which authors revealed that implementation of the quality system actually improved, with varying degrees, the performance of organizations in terms of lower production costs, higher employee morale, improved customer loyalty, improved revenues and other related benefits. In the United Arab Emirates (UAE), Badri investigated the effect of quality management on firm performance using path analysis technique and concluded that top management support is a primary force behind creating a supporting environment for successful implementation of quality practices [17]. In Egypt, Farid examined the potential and impact of applying TQM principles to Egyptian garment and textile industries [18], and in Saudi Arabia, Khalaf illustrated the effect of quality as a component of the excellence triode represented by quality, productivity and cost [19].

Internationally, the interest in assessing the impact of ISO9000 and TQM initiatives had been overwhelming and very large number of research studies was conducted for this purpose in the United States of America, Europe, Japan, South America, and many other countries. In this article only a number of studies will be cited for reference.

Johnson indicated that American companies have realized many benefits as a result of implementing ISO9000 system standard such as changing organizational structures and cultures, increased interest in research and development, establishment of customer care centers, improvements in sales volumes, and increased profitability, just to name a few [20]. Mats and Carlson surveyed more than hundred firms that implemented ISO9000 system and found that areas mostly affected by the new system were production, marketing, and design [21]. Motwani et al examined the motivations of Japanese companies to implement ISO9000 system and concluded that entering new international markets and increasing market shares were among the main reasons for their initiatives [22]. In the retail banking sector in South Africa, Vermeulen and Edgeman presented a survey of key quality improvement strategies and assessed the performance of retail banks and South Africa with respect to these strategies and concluded that continuous quality improvement is a way of life and successes could be measured when organizations achieve full transformation towards a TQM culture [23]. McCraken and Haynak presented a simulation study to examine the impact of quality on productivity in which they proved that as

defects, scrap and rework decreased, productivity increased [24]. Kamlan et al investigated through regression analysis the impact of quality management tools on performance and reported a positive relationship between the two [25]. In Singapore, Cunningham and Janice conducted a survey to examine the impact of total quality management programs on the performance of Singaporean companies and concluded that TQM programs have reduced absenteeism and employee turnover [8]. In a study conducted by Larson and Sinha on TQM impact, they examined the impact of various TQM tools on effectiveness factors such as quality, productivity and employee satisfaction, and concluded that TQM tools have resulted in significant business benefits [31].

In accordance with existing literature about TQM and ISO9000 system implementations, it becomes evident that quantitative research studies and surveys are the only viable means to assess benefits and obstacles of these quality initiatives, and that such means have enabled researchers examine and recommend useful future directions. As such, this study has been the first in Palestine to explore the impact of ISO9000 principles on business effectiveness of Palestinian manufacturing and service firms who have been implementing the system through the year 2002.

Framework of Study Methodology

This research study was based on a quantitative statistical assessment of the impact of implementing IS09000 Principles on organizational effectiveness. It should be noted here that the influence of the ISO9000 system was investigated with respect to its underlying quality principles whose impacts on performance measures were assessed. Such quality principles would lead to the stated objectives of IS09000 implementation and represent a true translation of the commitment of top management towards organizational change and business re-engineering. Based on this approach, a general methodology for implementing this research study can be described as follows:

1. Determine a set of quality principles that reflect the face contents and interpretations of the ISO9000 system clauses (i.e., causes).
2. Determine a set of business performance indicators that are directly linked to the selected quality principles (e.g., effects).
3. Formulate statistical hypotheses that will respond to the questions raised in this study.
4. Collect and validate field data.
5. Use statistical tools to analyse data and test hypotheses.

6. Formulate and generalize results and accordingly develop recommendations for improved implementation of IS09000 quality management standard.

Model and Variables of the Study

According to the general framework above, two sets of variables were defined for this purpose; independent or control variables, and dependent or response variables. The first set of variables represented strategies, plans, and actions taken by management that translated the implementation of the basic quality principles and requirements of IS09000 system. Dependent variables were those reflecting the outcomes of implementing IS09000 quality principles and requirements. The two sets are defined and explained in Tables 1 and 2.

It should be noted that, on one hand, the selection of independent variables was guided the archived literature [1-2, 30-31], consultations with practitioners and experts in the fields, and by the principles of the ISO90001 system. The clauses of the system, for example, include management commitment to clear quality strategy, leadership and employee involvement, customers' satisfaction, and measurement and analysis.

On the other hand, the determination of the dependent variable set was guided by Likert's Organizational Characteristics and others [28, 31]. These characteristics, namely, quality, productivity, and employee satisfaction represented key performance indicators that were judged by firms' managers to measure business goals and hoped outcomes of ISO9000 implementation. It was obvious that such indicators took into account the interests of organizational stakeholders represented by customers, employees and shareholders [30].

Table 1: Model Variables

Independent Variables: ISO9000 Quality Principles	**Dependent Variables: Business Performance Indicators**
I. Adopted Strategy	**I. Employee Satisfaction (ES)**
1. Mission and quality objectives	1. Job suitability
2. Annual business planning	2. Fellow workers and superiors
	3. Pay and promotion
	4. Satisfaction with organizational growth
II. Customer Satisfaction Efforts (CS)	**II. Productivity Level**
3. Customer focus and feedback	5. Time utilization

…Continue table (1)

Independent Variables: ISO9000 Quality Principles	Dependent Variables: Business Performance Indicators
4. Responsiveness	6. Production output rate
5. Dependability (sustaining quality levels)	
III. Continuous Process Improvement (CPI)	**III. Quality Level**
6. Planning for quality	7. Volumes of product rework and scrap
7. Use of quality management tools	8. Process non-conformities
8. Measurement and analysis	9. Number of customers' complaints
9. Reporting, communications and feedback	
IV. Leadership Development (LD)	
10. Unified goals	
11. Extensive education/training at all levels	
12. Reward and recognition tied to performance	
13. Employee participation in problem solving	

Table 2: Explanations of Model Variables

Variable	Explanations
ISO9000 Quality Principles	Such principles emphasize management of the entire organization in such a way that it excels in all dimensions of its operations. It implies commitment to quality as a strategic dimension, customer focus and related efforts, leadership development and continuous improvement efforts. • Quality starts at top management levels as a strategic dimension that is continuously reflected in a solid understanding of quality requirements and annual business plans. • These quality principles call for the entire organization to work in unity for the purpose of customer satisfaction in a dependable, responsive and sustainable manner.

...Continue table (2)

Variable	Explanations
	• Continuous improvement mandates quality planning, use of measurements and analysis techniques, and establishment of proper reporting and communications tools • Leadership Development is critical to the evolution of a quality culture in the organization. This requires unified goals, employee training and participation, and reward and recognition.
Employee Satisfaction	Defined as employees' and managers' satisfaction with fellow workers, jobs, superiors, their organization compared with others, pay, progress in the organization, and opportunities for advancement in the future.
Productivity Level	Defined as assessment by employees and managers of the efficiency of work done in the divisions or departments as well as the quality with which the work is done. Productivity is measured in terms of output production volume per unit time. Another indication for productivity used here is percent of time utilized of production resources including employee and equipment time
Quality Level	Defined as assessment of the quality of work done in their organizations according to the requirements set to meet customer needs and satisfaction; quality as conformance to specifications. Quality is measured in terms of volumes of product rework, scrap, process non-conformities, and number of customer complaints

Each of the study variables was measured directly through a questionnaire that was specifically designed and used to collect data from companies who were certified to an ISO9000 model or implemented a quality initiative having the same objectives. A 5-point scale system (1-5) was used to measure responses of companies to these questions. The 5- point scale system represented responses ranging from 'very high' (5), through 'high' (4), 'moderate' (3), 'low' (2), and finally 'very low' (1). The reliability of the scale in this study was estimated using Cronbach's alpha formula to determine mean interim correlation where a value of 0.7 or more represents a good criterion for scale reliability [27].

The questionnaire was developed by the author who has been working with Palestinian companies over the past 7 years as a quality consultant. It is divided into three main sections, where the first part provided a general demographic firm description such as business category, type, number of employees, existing markets, and number of years in business, type of technology, legal form, and other aspects. The second and third parts were dedicated to capturing firms' responses to the dependent and independent variables stated above through a form containing 65 related questions representing the above categories of variables. As such, each variable in Table 1 was addressed through an average of 3 questions.

Before used for actual data collection, the questionnaire was tested and validated to assure understanding of the meanings of presented concepts, clarity of statements, and adequacy of the representation of the basic variable categories. Such a verification process was made through interviews with a pilot sample of firms included in this study.

Formulation of Research Hypotheses

This study is concerned with answering basic questions raised in the objectives, that is, assessment of the degree of implementing ISO9000 quality management principles and assessment of the impact of implementing these principles on organizational effectiveness at Palestinian firms. Therefore, two basic hypotheses have been proposed and tested for this purpose, each responding to one question.

Research Question I Hypothesis

This hypothesis test determined the degree of implementing basic ISO9000 quality system principles (i.e., independent variables). The null hypothesis assumed that no such real implementation had actually taken place, while the alterative hypothesis implied that a significant degree of implementation was actually realized. The null hypothesis assumed that firms obtained certification without paying genuine attentions to improvements efforts, thus satisfying 'face' requirements of the ISO9000 system. Indeed, it was perceived that the loose and widely flexible interpretation of the ISO9000 system requirements had contributed to implementation problems that led to bad quality perception among consumers [26].

A significant degree of implementation of the ISO9000 quality system principles implied that a statistical average score of 2.5 or better was realized

using the 5-point scale system described above. This level was selected since the sample size is relatively large compared to population count and as such the chances of extreme random variations would be minimal. Therefore, the first general hypothesis was formulated in terms of average score (μ) as follows:

H_{oi}: μ <2.5), implying there is no genuine implementation of ISO9000 quality principle (i).

H_{li}: μ >2.5), implying there is significant implementation of ISO9000 quality principle (i).

It should be noted that the above hypothesis was a general one relating to key variables in the independent variable list of Table 1. Consequently, a separate hypothesis test would be implemented for each key independent variable as shown in the coming sections.

Research Question II Hypothesis

This hypothesis test aimed at assessing the impact of implementing ISO9000 quality system principles on improving organizational effectiveness in terms of quality, productivity, and employee satisfaction. The assessment of this impact could be viewed from two perspectives, first, by assessing the significance of improvement on its own merit, and second, by examining the association between scores of implementing quality management principles and those relating to organizational effectiveness factors. Therefore, two types of hypotheses were formulated.

Question II Hypothesis (a)

This hypothesis test examined the degree of realizing actual benefits resulting from implementing basic ISO9000 quality system principles (i.e., dependent variables). The null hypothesis assumed that no such benefits were obtained, while the alternative hypothesis assumed that firms actually obtained real benefits in terms of employee satisfaction, quality and productivity.

Again, a significant degree of organizational benefits meant attaining a statistical average score of 2.5 or better is obtained using the 5-point scale system described above. Therefore, a general hypothesis was formulated in terms of average score (μ) as follows:

H_{oi}: (μ<2.5), implying that no significant effectiveness are obtained.

H_{li}: (μ>2.5), implying that significant effectiveness are obtained.

It should be noted that the above hypothesis was a general one relating key organizational effectiveness factors in the dependent variable list of Table I, and consequently, a separate hypothesis test would be implemented for each key dependent variable.

Question II Hypothesis (b)

This hypothesis test would examine the association between implementing ISO9000 quality principles and realized effectiveness. In other words, the hypothesis would reveal whether the realized effectiveness were actually due to implementing ISO9000 quality principles. As such, this hypothesis involved testing the correlation between implementing each quality principle, independent variable, and realized effectiveness as given by each dependent variable. The Statistical Correlation Coefficient (r) was used to measure the strength of the relationship between independent and dependent variables given in the study model, where r assumed values in the range [-1, + 1]. Therefore, this hypothesis was formulated as follows:

H_o: (rij =0), implying no positive relationship between independent variable i and dependent variable j.

H_l: (rij >0), implying there is a positive relationship between variables.

Used Statistical Analysis Tools

The various statistical analysis tools used in this research were as follows:

1. Cronbach alpha test to examine the reliability of the data.
2. The **t**-test to examine the validity of the formulated hypotheses I and II (a).
3. Correlation Coefficient procedure to determine the strength of the relationship among variables in hypothesis II (b).
4. The **t**-test analysis and multiple linear regressions to examine the significance of the correlation coefficients between quality principles and organizational effectiveness.

Presentation of Data Summaries

This cross-sectional study was based on collecting and analyzing field data from companies known to the author that were implementing quality management system ISO9000 in Palestine. At the time of conducting this study during the end of year 2001 and 2002, there were about 60 private-sector firms in Palestine representing various industrial and services sectors that were implementing ISO9000 quality system. Data were collected by author using the designed questionnaire from 40 companies through interviews with company management and employees. The data collection process included observing records and indicative evidence as necessary; besides, responses were cross-verified with company officials on random basis. In doing so, at each company certain questions were presented to company management (e.g., General

Manager, Operations Manager, etc.) and other questions were presented to middle-level management (i.e., department or section heads) and employees. This method of data collection helped minimize inaccuracies in understanding and interpreting questionnaire statements while avoiding any biased influence. The scale reliability as computed using the Cronbach alpha test was 0.84.

Summary Demographic Information

The first portion of the questionnaire data provided general descriptive information about firms included in the study such as business sector, number of employees, legal form, approximate capital investment, year of establishment, and year of implementing the ISO9000 system. This demographic information is presented in Table 3.

Table 3: Demographic Information of Firms Included in the Study

Business Sector		**Year of Establishment**	
Engineering industries (metal wood, paper, plastics, leather)	13	Before1980	9
Stone and Marble	2	1981-1990	22
Chemical and Pharmaceutical	2	1991-1997	9
Food	3	**Number of Employees**	
Garment and Texti1	2	Less than 40	20
Contracting	7	40-100	10
IT and Telecommunications	2	101-200	7
Engineering Consulting and Material Testing laboratories	5	More than 200	3
Others	4	**Year of ISO9000 Implementation**	
Capital Investment		1997	8
Less than 0.5 million$	5	1998	7
(0.5-1.0) million $	15	1999	12
(1.0-5.0) million $	14	2000	8
(5.0-10.0) million $	4	2001	4
More than 10 million $	2	2002	1

Summary Descriptive Statistics

The second and third portions of the questionnaire respectively provided data about the degree of implementing the quality management principles

(independent variables) and the extent of realizing tangible improvements as a result of implementing these principles (dependent variables). These data were collected and represented according to the defined 5-point scale system.

As said before, each of the main variables contained in the study model and given in Table 1 was examined using a number of related questions. Consequently, 40 survey questions addressed the first set of variables that dealt with degree of implementing IS09000 quality system principles at participating companies, while 25 questions were dedicated to the variables that dealt with actualized benefits of implementing these principles. Basic statistics including averages and standard deviations of the data pertaining to these two sets of variables are given in Table 4, where responses from 40 firms were used in the computations of these statistics.

Table 4: Summary Descriptive Statistics

Degree of Implementing 1809000 Principles			**Degree of Realized Improvements**		
Variable	**Average**	**Std. Dev**	**Variable**	**Average**	**Std Dev.**
Strategy	3.73	0.851	Employee Satisfaction	2.78	0.921
Customer Satisfaction	3.50	0.671	Productivity	3.08	0.756
Continuous Process Improvement	2.71	0.942	Quality	2.72	0.810
Leadership Development	3.12	0.789			

Testing Hypothesis I: Degree of Implementing ISO9000 Quality Principles

To test the implementation of quality principles, the t-test was used since the population mean and standard deviation were not known. The confidence level selected was 95% (i.e., α =0.05) and number of degrees of freedom (df) was 39 (i.e., df=n-l, n=40), where n represented number of companies in the survey. The test was performed for each main ISO9000 quality principle given in Table 1. That is, the following hypotheses were tested

1. Strategy

H_o: (μ <2.5), implying there is no genuine adoption of Quality Strategy.

H_l: (μ>2.5), implying there is significant adoption of Quality Strategy.

2. *Customer Satisfaction Requirements*

H_o: ($\mu<2.5$), implying there is no genuine implementation of Customer Satisfaction.

H_l: ($\mu>2.5$), implying there is significant implementation of Customer Satisfaction.

3. *Continuous Process Improvement (CPI)*

H_o: ($\mu <2.5$), implying there is no genuine implementation of CPI.

H_l: ($\mu >2.5$), implying there is significant implementation of CPI.

4. *Leadership Development*

H_o: ($\mu<2.5$), implying there is no genuine implementation of Leadership Development.

H_l: ($\mu>2.5$), implying there is significant implementation of Leadership Development.

The value of the *t* statistic was computed for each hypothesis and compared with the *t* value obtained from the *t* Table at $df=39$ and $a=0.05$. This *t* value is approximately 1.68. The computed values of the *t* statistic and the results of the one-sided hypotheses tests are given in Table 5, where null hypotheses were rejected when computed *t* value exceeded 1.68 [29].

Table 5: Computed *t* Values and Results of Hypothesis Test I

Hypothesis	Computed t- value	Decision on H_o	Interpretation of decision
Strategy	9.14	Reject	Quality is considered as a strategy dimension by top management
Customer satisfaction	9.42	Reject	Customer satisfaction and related system are implemented
Continues process improvement (CPI)	1.41	Accept	No significant continuous improvement efforts are actually implemented
Leader ship development	4.96	Reject	Efforts are some what made to develop leader ship

It is quite clear from the results of Table 5 that ISO9000 certified companies in Palestine were actually implementing certain important quality principles as they strongly emphasized quality strategies and customer satisfaction principles. This is reflected by the fact that such companies have embarked on quality initiatives such as the ISO9000 quality management with a

deep desire to improve sales figures and increase market shares. Although the test showed a significant interest in leadership development, companies demonstrated less attention and efforts in this quality principle as most of these efforts concentrated on technical training in areas most relevant to the requirements of the ISO9000 system, and not geared towards integrated organizational leadership development.

Notably, results showed that companies in Palestine have not yet exerted real efforts to continuously improve existing strategies, systems, plans, and operations. This conclusion was not surprising since continuous process improvement and the use of quantitative techniques and measurement-based systems for performance assessment require an advanced degree of system maturity that is mostly related to creating a culture of process improvement. This requires knowledge and experience with total quality management tools and how to apply them in real setups, a stage that most companies have not reached yet since most companies have very recent exposure to and experience in quality management systems. Besides, leadership develop and comprehensive human resource developments represent a long-term process that requires extensive investments and accumulations of expertise, such requirements are to be seen in the future in Palestine.

Testing Hypothesis II (a)

To test the significance of realized benefits, the *t-test* was used again under similar condition stated above under Hypothesis I. That is, the confidence level was 95% (i.e., $\alpha=0.05$) with 39 degrees of freedom. The test was performed for each main effectiveness factor given in Table 1, where the following hypotheses were tested.

1. Employee Satisfaction

H_o: (μ <2.5), implying there is no significant benefit in terms on Employee Satisfaction.

H_l: (μ >2.5), implying there is significant benefit in terms on Employee Satisfaction

2. Quality Level

H_o: (μ <2.5), implying there is no benefit in term of Quality Level.

H_l: (μ >2.5), implying there is significant benefit in terms of Quality Level.

3. Productivity Level

H_o: (μ <2.5), implying there is no benefit in terms of Productivity.

H_l: (μ >2.5), implying there is significant benefit in terms of Productivity.

The value of the t statistic was computed for each hypothesis and compared with the t value obtained from the t Table at df=39 and α=0.05, where t value is approximately 1.68. The computed values of the t statistic and the results of the tests are given in Table 5, where null hypotheses were rejected when related computed t value exceeded 1.68.

Table 6: Computed t Values and Results of Hypothesis Test II (a)

Hypothesis	Computed t- value	Decision on H_o	Interpretation of decision
Employee satisfaction	1.89	Reject	Employee satisfaction was observed but very weak
Productivity Level	4.79	Reject	Significant productivity improvement
Quality Level	1.69	Reject	Quality improvement observed but very weak

It can be seen from the results of Table 6 that companies have achieved certain benefits especially in terms of productivity improvements. Although improvements in quality level and employee satisfaction were observed, it was clear that such improvements were still very week and barely significant. These results reflected the fact that firms still emphasized productivity as a profound measure of effectiveness, thus taking actions towards increasing production outputs. The weak significance of effectiveness as measured by quality and employee satisfaction should not be surprising too since these two aspects require more focus on continuous improvements, use of quantitative measurements techniques, and investments in leadership development. However, as shown by the results of Hypothesis I (Table 5), these aspects have not yet received significant attention.

Testing Hypothesis II (b)

This test dealt with examining the association, if any, between implementing quality management principles and realized effectiveness in terms of quality, productivity, and employee satisfaction. Quality management principles considered in this case were those that proven to be significantly implemented according to Hypothesis Test I above. As such, this hypothesis test examined the relationships between main organizational effectiveness performance indicators, on one hand, and the significant ISO9000 quality principles, on the other hand, namely, strategy, customer satisfaction, and

leadership development. The correlation coefficient (r) was used to measure the strength of the relationship between each variable pair stated in this hypothesis, where results are provided in Table 7.

Table 7: Correlation Coefficient (r_{ij})

ISO9000 Quality Principles (I)	Organizational Effectiveness		
	Productivity	**Quality**	**Employee satisfaction**
Adopted Strategy	0.37	0.26	0.29
Customer Satisfaction	0.46	0.30	0.31
Leadership Development	0.35	0.32	0.34

As said before, a basic research posture is to show whether there are positive relationships between variables stated in the research model of Table 1. It was obvious from the results in Table 6 that significant relationships between ISO9000 quality principles and organizational effectiveness were positive but weak for all aspects,

To test the statistical significance of the r_{ij} values, the statistic $t= r.[(n-1)^{1/2}/(1-r^2)^{1/2}]$ was computed for each case, and the null hypothesis was rejected when computed t values exceed the Table t value at significance level α=0.05 and $df=38$ [29], The results of these calculations are given in Table 8.

Table 8: Computed Values for Hypothesis Test II

Computed *t* Value	**Productivity**	**Quality**	**Employee satisfaction**
Adopted Strategy	2.64	1.71	1.86
Customer Satisfaction	3.19	1.93	2.00
Leadership Development	2.45	2.08	2.22

Given the Table t value is 1,68, it was evident that the null hypothesis was rejected thus concluding with 95% confidence that positive relationships existed between scores representing ISO9000 system principles and organizational effectiveness indicators, From Tables 7 and 8, quality had the weakest relationship with significant ISO9000 quality management principles, while productivity was notably affected by the implementation of these quality principles, Employee satisfaction was least influenced by company strategy, while showing a high degree of association with leadership development.

Furthermore, multiple regression analysis was conducted between effectiveness factors and quality management principles, and as shown in Table 9, the results confirmed the presence of significantly statistical linear

relationships between each effectiveness factor and other three quality principle factors, In this case, using α =0.05 and number of independent variables = 3, $F_{0.05,3,36}$=2,85 implying that there were certain positive regression coefficients.

Table 9: Results of Multiple Regression Analysis

Dependent variables: effectiveness factors	Computed F – ratio
Productivity	7.25
Quality	4.10
Employee satisfaction	5.30

Discussion and Conclusions

The statistical analysis showed that significant efforts were actually made to improve quality levels, productivity and employee satisfaction; however, the realized benefits of organizational effectiveness as a result of these efforts were still moderate. Further efforts are needed especially in continuous process improvement and leadership development fields. Development efforts would need to capitalize on existing successes and future improvement programs must be streamlined with basic quality management principles so that ISO9000 certification becomes no longer an objective by itself.

In light of the presented analysis, statistically valid correlations between implementing quality principles and organizational effectiveness existed. Nevertheless, it should not be understood that the moderate associations established between implementing quality principles and organizational effectiveness meant that quality management systems had reached a state of maturity and pushed quality levels to their boundaries. Instead, it only established a strong conclusion that efforts made have actually led to certain improvements, and that further investments in continuous quality improvement and leadership development would be justified and would pay off in the long run.

The following areas of development should receive emphasized attention:

- *Clearer top management vision and support*. A major quality principle is management commitment and dedication to quality. Management must demonstrate its commitment through deeds, personal involvement, and maintaining close contact with those responsible for producing quality service and products.
- *The need to innovate and explore new ideas*. Palestinian firms must emphasize continuous improvement and explore new ways of doing things.

This concept requires setting standards that are well defined, customer-driven, and measurable. Quantitative measurement methods must be largely used that reflect actual tangible improvements and guide future plans.

- The *team approach to quality.* The team approach is another important basic principle for managing quality in the manufacturing and service industries. This approach allows productive interaction among employees and gives opportunities to address problems smartly, through cross learning and knowledge transfer, and internal communications.
- *Hiring and training the right people.* Hiring, training and retraining competent employees proved to be one of the keys to managing quality, since quality can never be improved beyond the capabilities, training, and motivation of employees.

Future Studies

Although many more issues remain to be investigated, this study consolidated a strong evidence that quality management systems implementation in Palestine business communities can work and that more efforts are yet to made in this direction. The following issues are recommended for future studies:

1. Investigation of the impact of additional company parameters (e.g., capital, number of employees, year of establishment, etc.) on organizational effectiveness and quality system results.
2. Another interesting study to perform a comparative analysis between the results documented in this article and those in other countries.
3. Development of a modified management model to Palestinian companies to better implement the ISO9000 standard.

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